United States Environmental Protection Agency
Region II
POLLUTION REPORT

270302

Date: Wednesday, September 17, 2008
From: Thomas Budroe

To:

Beckett Grealish, USEPA Region 2, ERRD, RAB	Thomas Budroe, US EPA Region II
Tim Grier, USEPA Headquarters 5202G	Mary Mears, USEPA, Region 2, PAD
David McLeod, USEPA, Region 2 CID	Delmar Karlen , USEPA Region 2 ORC-NJSFB
Carole Petersen, USEPA, Region 2ERRD-NJRB	Paul Zammit , USEPA Region 2 OIG
George Zachos, USEPA Region 2 ERRD	Andrew Raddant, Department of Interior
Juan Fajardo, USEPA Region 02	Joe Rotola, USEPA Region 02
Fred Mumford, NJDEP	Eric Wilson, USEPA

Subject:
Final
Bergen Perchlorate Ion Site
Saddle River, Upper Saddle River, Woodcliff Lake, NJ

POLREP No.:	2	**Site #:**	WW
Reporting Period:		**D.O. #:**	048
Start Date:	6/4/2007	**Response Authority:**	CERCLA
Mob Date:	6/6/2007	**Response Type:**	Time-Critical
Demob Date:		**NPL Status:**	Non NPL
Completion Date:	4/10/2008	**Incident Category:**	Removal Action
CERCLIS ID #:	NJC200400133	**Contract #**	EP-W-04-054
RCRIS ID #:			

Site Description

1. Site Location

The Site consists of a groundwater aquifer contaminated with perchlorate. The location of the Site is currently defined as the communities of Saddle River Borough, Upper Saddle River Borough, Park Ridge Borough and Woodcliff Lake Borough, Bergen County, New Jersey in a residential area. The extent of the perchlorate contamination in the groundwater has not been delineated, and the Site may expand as additional data are received and evaluated.

Homes constructed over much of the Site were built in the 1960s. Previous to housing, much of this area was reportedly farmed as apple, peach and cherry orchards as well as strawberry fields.

Perchlorate contamination has impacted the semiconfined bedrock aquifer within the Brunswick

Formation of the Newark Group. The Brunswick Formation is composed of mudstone, siltstone and sandstone, and is a major source of potable water for much of Bergen County. The Newark Group generally strikes north-northeast and dips to the west-northwest at 10 degrees in this area. In the Brunswick Formation, groundwater is stored and transmitted through a series of interconnected joints, fractures and solutions channels collectively referred to as secondary porosity. This secondary porosity decreases with depth. As a result, only the upper 200 to 500 feet of the Brunswick Formation is considered an aquifer. Groundwater flow tends to be anisotropic with a principal direction of flow parallel to strike. Groundwater flow velocities in fractured rock aquifers are generally much higher than in unconsolidated aquifers; and high yielding wells can draw groundwater from distances much farther (up to several miles) than similar wells in unconsolidated formations.

2. Description of threat
There has been and continues to be a release of perchlorate in and through the groundwater at the Site. The U.S. Environmental Protection Agency's (EPA's) well water sampling results, in addition to results from other agencies, has demonstrated a pervasive presence of perchlorate in groundwater in the semiconfined bedrock aquifer.

To date, over 150 residential wells surrounding Municipal Well 10 have been sampled in total by local, State and Federal agencies. Perchlorate was found above the detection limit in wells over two miles west of Municipal Well 10. Most of the wells sampled are located west of the Garden State Parkway. Of the wells sampled, approximately 75% had a perchlorate concentration that exceeded the method detection limit with concentrations up to 110 µg/L. Thirteen residential wells had a perchlorate concentration exceeding EPA's Drinking Water Equivalent Level (DWEL) of 24.5 µg/L. Of the thirteen residential wells exceeding 24.5 µg/L, the New Jersey Department of Environmental Protection (NJDEP) installed pilot treatment systems at two of these residences, one residence was sampled by EPA in October 2006 and the subsequent analytical results indicated the perchlorate concentration was less than 24.5 µg/L and one resident would not allow EPA to sample their well. The other nine residences, with well water perchlorate exceeding 24.5 µg/L, are the subject of this removal action.

C. Preliminary Assessment/Site Inspection Results
In 2003, the Park Ridge Borough collected supply well water samples for perchlorate analysis as required by the federally-mandated Unregulated Contaminant Monitoring Rule (UCMR). Perchlorate was detected at one sampling location at a level of 13 µg/L. At the time of the NJDEP referral to EPA, over 55 private wells had been sampled and analytical results indicated that 17 wells demonstrated perchlorate concentrations over 5 parts per billion (ppb). The highest concentration detected was 91 ppb.

From November 7 through November 9, 2005, EPA collected a total of 32 aqueous, potable well samples from 29 residential private wells. All samples were shipped to the EPA Region I, New England Laboratory for perchlorate analysis on November 9, 2005. Perchlorate analysis was conducted using High Performance Liquid Chromatography/Tandem Mass Spectrometry (HPLC MS/MS) technique (EIASOP-LCMSCIO4W1). The sample results for Saddle River ranged from non-detect to 16 µg/L. The sample results for Upper Saddle River ranged from non-detect to 6.2 µg/L. Of the 29 sample locations, 27 had results reported with detectable levels of perchlorate. The following table provides information on the sample collection and analytical

results.

Table 1: Well Water Sample Collection Information and Perchlorate Analytical Results
November 2005

Sample Location	Sample Result (µg/L)	Well Depth (ft)
Saddle River	6.7	100 *
Saddle River	0.85	125 *
Saddle River	ND	200
Saddle River	1.2	200 *
Saddle River	5.2	231
Saddle River	10	200–250*
Saddle River	10	Unknown
Saddle River	16	Unknown
Saddle River	7.4	Unknown
Upper Saddle River	4.2	105
Upper Saddle River	ND	126
Upper Saddle River	1.8	130
Upper Saddle River	0.84	150
Upper Saddle River	0.48	150
Upper Saddle River	0.31	150
Upper Saddle River	2.0	160
Upper Saddle River	0.44	160
Upper Saddle River	0.36	160
Upper Saddle River	4.5	200
Upper Saddle River	4.0	300
Upper Saddle River	0.49	500
Upper Saddle River	0.58	550
Upper Saddle River	6.2	550
Upper Saddle River	0.27	Unknown
Upper Saddle River	0.3	Unknown
Upper Saddle River	0.7	Unknown
Upper Saddle River	1.1	Unknown
Upper Saddle River	0.8	Unknown
Upper Saddle River	0.92	Unknown
Trip Blank	ND	

*The residents who provided this well depth figure were not certain of its accuracy.
ND: Nondetect

NJDEP provided EPA with a list of Site residents they previously sampled having reported perchlorate results approaching or exceeding 24.5 µg/L. From October 17 through October 19, 2006, aqueous, potable well samples were collected from a pre-treated water source in eleven residences on the aforementioned list provided by NJDEP. All samples were shipped to the EPA Region I New England Laboratory for perchlorate analysis on October 19, 2006. All of the sample locations had results reported with detectable levels of perchlorate and nine had results exceeding

EPA's DWEL for perchlorate of 24.5 µg/L. The following table provides information on the sample collection and analytical results.

Table 2: Well Water Sample Collection Information and Perchlorate Analytical Results
October 2006

Sample Location	Sample Result (µg/L)	Well Depth (ft)
Saddle River	41	220
Saddle River	39	245
Saddle River	37	300
Saddle River	17	Unknown
Saddle River	33	Unknown
Saddle River	44	Unknown
Upper Saddle River	42	101
Upper Saddle River	47	125
Upper Saddle River	16	Unknown
Upper Saddle River	91	Unknown
Woodcliff Lake	95	Unknown

On January 26, 2006, EPA released "Assessment Guidance for Perchlorate" (Guidance). Following the National Academy of Sciences' (NAS) National Research Council (NRC) review, EPA adopted a reference dose (RfD) for perchlorate of 0.0007 milligram/ kilogram-day (mg/kg-day), and the Guidance applies the RfD to EPA's CERCLA program. This RfD leads to a DWEL of 24.5 µg/L or 24.5 ppb.

In sum, the primary contaminant of concern found in groundwater at the Site is perchlorate. The Removal Site Evaluation (RSE) completed by EPA documented the presence of perchlorate in many wells from which groundwater is extracted for potable purposes. The level of perchlorate detected in samples taken from nine of the potable wells sampled by EPA was in excess of the EPA DWEL of 24.5 µg/L. Its presence is indicative of some historical release(s) which may have occurred at or up gradient of the Site. One or more point and/or non-point sources of perchlorate contributed to the levels of perchlorate found in groundwater at the Site. The identity of these source(s) is, however, currently unknown.

Current Activities

NJDEP communicated their interest to install pilot point of entry treatment (POET) systems at two of the nine residences where EPA had planned to install POET systems. The OSC informed NJDEP that EPA had no objection to the above.

The bid to install the residential perchlorate POET systems was awarded to a subcontractor on August 13, 2007. A Site walk with EPA's ERRS contractor and the POET installation subcontractor was conducted on September 19, 2007, to provide an opportunity for the subcontractor to appraise the space available and other circumstances impacting the installation of the POET systems. Of the nine residences originally requiring POET systems, EPA will only be installing four systems due to NJDEP installing pilot systems at two of the residences, two other residents elected to make arrangement to have their house connected to a newly installed city water

main and one residence was sold and subsequently demolished.

To mitigate the threats posed by this Site, from October 1, 2007 to October 5, 2007, EPA's subcontractor installed POET systems in four residences where EPA documented perchlorate levels exceeding EPA's DWEL (24.5 µg/L). The POET systems consist of two or four canisters of resin, depending on the water demand of the residence, to remove the perchlorate ion, and a series of valves to isolate various portions of the system and taps to collect samples from different stages of the system. The resin used in the canisters to remove the perchlorate is the ResinTech brand SIR-110-HP, which is a strong base anion resin. Approximately two cubic feet of resin was placed for use in each canister. Following POET system installation the treated water was sampled and sent to the Region I EPA Lab for perchlorate analysis with a two week turnaround time. The analytical results indicated that perchlorate was not detected at a detection limit of 0.4 µg/L in the treated water. A letter was sent to the four residents informing them of their results.

On April 10, 2008, EPA collected samples of the treated well water for perchlorate analysis to check on the current effectiveness of the POET system. Samples were collected at the midpoint of the treatment system at which point the water had been treated by only one of the two canisters. Samples were also collected at the terminal end of the treatment system. All sample results indicated nondetect for perchlorate at a reporting limit of 0.2 µg/L. A letter was sent to the four residents informing them of their results.

NJDEP has established a perchlorate Interim Ground Water Quality Criteria concentration of 5 µg/L which is lower than EPA's DWEL of 24.5 µg/L. NJDEP has assigned a Case Manager to the Site and has already installed numerous perchlorate POET systems on-site. Therefore, EPA is terminating all federal removal activities and is referring the Bergen Perchlorate Ion Site back to NJDEP.

Planned Removal Actions

All work planned for this removal action has been completed.

Next Steps

All work proposed in the Action Memorandum has been satisfactorily completed.

Key Issues

There are no nationally significant or precedent-setting issues.

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
ERRS - Cleanup Contractor	$137,797.00	$27,269.71	$110,527.29	80.21%
RST/START	$6,080.00	$0.00	$6,080.00	100.00%
Intramural Costs				
USEPA - InDirect	$47,026.00	$0.00	$47,026.00	100.00%

Total Site Costs	$190,903.00	$27,270.00	$163,633.00	85.72%

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

epaosc.org/bergenperchlorate